

Mr. Seth-Smith pointed out that, so far, no systematic breeding experiments had been carried out with Budgerigars, but with three distinct colour-phases of a free-breeding species to work with, the material for some very interesting experimental breeding was at hand.

He acknowledged his indebtedness to M. Pauwels for the loan of the blue specimen exhibited at the meeting.

PAPERS.

5. On a Possible Cause of Pneumo-enteritis in the Red Grouse (*Lagopus scoticus*). By H. B. FANTHAM, D.Sc., B.A., F.Z.S., and H. HAMMOND SMITH, M.R.C.S., L.R.C.P., F.Z.S.

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The importance of Coccidiosis as a serious disease of the digestive tract of birds has lately been clearly established by Fantham in England in the case of young Grouse and Pheasants, and by Morse and Hadley in America in Fowls and Turkeys.

While pursuing our researches at the Frimley Experimental Farm belonging to the Grouse Disease Inquiry Committee during the summer of 1910, we found that out of 40 Grouse chicks hatched, 17 died between the ages of 4 and 6 weeks. These birds were examined by both of us and were found to be suffering from Coccidiosis, the parasites (*Eimeria* (*Coccidium*) *avium*) occurring especially in the duodenum and cæca. Many of these young birds, however, also presented symptoms of pneumonia, consequently the lungs, trachea, and bronchi of the birds were most carefully examined. The results of our examination were most interesting, for we both found coccidian oöcysts in the trachea, bronchi, and bronchioles. Inside these oöcysts the processes of formation of the four sporoblasts were sometimes found to be going on. The oöcysts were probably acquired by the mouth, and a few of them, instead of passing directly down the digestive tract, as is usual, may have found their way, *viâ* the glottis, into the trachea and bronchioles. It is possible that these coccidian cysts in the bronchioles would be quite capable of setting up sufficient irritation to account for the pneumonic symptoms seen in the lungs of these young birds. It would seem, therefore, that the old name of pneumo-enteritis, as applied by Mr. Tegetmeier and others to one of the diseases that caused mortality in Grouse—a view which has met with much criticism—may after all be proved to have some foundation in fact.

References to Literature.

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- Disease among young Grouse." P. Z. S. 1910, pp. 672-691, 4 plates.
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- TEGETMEIER, W. B.—'Field,' vol. 104, p. 561 (24/9/04); vol. 105, p. 1027 (17/6/05); vol. 106, p. 410 (26/8/05); vol. 107, p. 465 (24/3/06).

6. On the Alimentary Tract of certain Birds and on the Mesenteric Relations of the Intestinal Loops. By FRANK E. BEDDARD, M.A., F.R.S., F.Z.S., Prosector to the Society.

[Received March 1, 1910 : Read November 29, 1910.]

(Text-figures 9-28.)

For some time past I have been accumulating notes relative to the viscera of birds which have died in the Society's Gardens, and have paid special attention to the alimentary tract. In the following pages I call attention to the intestinal tract of a number of birds which either have not been studied or as to which my own investigations lead me to disagree with earlier statements.

I have dealt more particularly with such species as have not been carefully studied from the point of view of the convolutions of the intestine, and am able to call attention to a considerable series of birds. The subject is by no means a new one, dating as it does from the accurate though few observations of John Hunter. I arrive, however, at rather different classificatory conclusions from others, and venture therefore to direct the attention of the Society not only to the new facts but also to certain classificatory inferences to which these facts point.

The observations which I lay before the Society may be considered under the following headings, viz. :—

- § Historical Survey, p. 48.
- § Description of the Intestinal Tract in various Groups of Birds, p. 50.
- § Some General Considerations, p. 86.
- § The Primitive Form of the Intestine in Birds, p. 86.
- § The Course of the Evolution of the Gut, p. 87.
- § The Mutual Affinities of Avian Families judged by the Intestinal Convolutions, p. 89.
- § The Relationship between the Gut and the Nature of the Food, p. 90.
- § Summary of Facts relating to the Intestinal Coils of Birds, p. 92.